Association between Behavioral Life-cycle Constructs and Financial Risk Tolerance of Low-to-moderate-income Households

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Utilizing data from an Internet survey among low-to-moderate-income households in several states, this study examined the link between behavioral life-cycle (BLC) constructs and financial risk tolerance. The results of ordinary least squares regression indicated a positive association between financial risk tolerance and several factors that measured the BLC constructs. Respondents who scored higher in self-control had significantly higher risk tolerance scores. Smaller effects were found for the mental accounting and framing constructs. These results suggest low-to-moderate-income households can benefit from financial education and commitment strategies.

Keywords: Financial risk tolerance; Behavioral life-cycle; Self-control; Mental accounting; Framing

Introduction

One contributing factor to the financial distress of households impacted by the financial crash of 2008 and subsequent severe, prolonged recession was the lack of sufficient savings to carry them through an extended period of unemployment. In particular, low-and-middle-income households were severely affected. Emergency fund research has consistently shown over the decades that only about one-third of households have the recommended three months of expenses in savings (Anong & DeVaney, 2010; Bhargava & Lown, 2006; Chang, Hanna, & Fan, 1997; Hatcher, 2000; Huston & Chang, 1997; Rodriguez-Flores & DeVaney, 2007; Washington, 2004). According to the 2012 Retirement Confidence Survey by the Employee Benefits Research Institute, approximately 60% of all American workers have less than $25,000 saved for retirement.

Financial counselors, educators, and policy makers have struggled with how to effectively motivate households to save. Financial risk tolerance has been positively associated with the propensity to engage in retirement planning and having an emergency fund (Deaves, Veit, Bhandari, & Cheney, 2007; Huston & Chang, 1997; Yang & DeVaney, 2012). Hariharan, Chapman, and Domian (2000) found a positive correlation between financial risk tolerance and net worth. According to Yuh, Hanna, and Montalto (1998), projected wealth at retirement increases with increased stock ownership. Stated differently, an increased willingness to take financial risks leads to increased wealth over time. Bajtelsmit, Bernasek, and Jianakoplos (1999) reported that men were more willing to take financial risks and thus had greater net worth than women. Finke and Huston (2003) found financial risk tolerance to be the strongest predictor of net worth for those who are older than 65 years old. Higher financial risk tolerance, the willingness to accept greater variability in investment returns, is generally linked to greater wealth accumulation. Risk tolerance has been shown to increase with education and financial literacy (Joo & Grable, 2004; Van Rooij, Lusardi, & Alessie, 2012; Yao, Hanna & Lindamood, 2004). However, little is known about the financial risk tolerance of low-to-moderate-income households. Most risk tolerance studies deal with investing behavior which may or may not apply to these households. In addition, it can be difficult to get low-income households to participate in investment research studies.

Consumer finance researchers have identified the need for additional theory-based studies on consumer decision making (Schuchardt et al., 2009). To better explain consumer decision-making and behavior, Shefrin and Thaler (1988)

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developed the behavioral life-cycle (BLC) hypothesis. The BLC uses the constructs of self-control, mental accounting, and framing to explain consumer decision-making behavior. Rabinovich and Webley (2007) found an association between BLC variables and savings behavior. Those households with longer time horizons and greater self-control tended to save more than others. Both risk tolerance and BLC constructs were found to be important in financial decision making behaviors. However, the association between BLC constructs and risk tolerance has not been widely studied, especially among low-to-moderate-income households. This study examines the BLC constructs of self-control, mental accounting, and framing in relation to the risk tolerance of low-to-moderate-income households.

Literature Review

The psychology of financial risk tolerance and the household decision to save have been widely studied. Wärneryd (1999) laid the foundation for the link between psychology and saving with his seminal book, *The psychology of saving: A study of economic psychology*. Wärneryd (1999) offered a historical review of how economics and psychology have developed. His focus on how the two fields interacted over time led him to suggest that economic psychology or behavioral economics could be used as the psychological foundation of economics, a field of applied psychology, or a separate field of study. Based on a thorough review of previous economic theories on saving and psychological concepts related to saving, he provided new insight on the integration of the two fields. Rather than trying to propose how much to save, his ideas offered a comprehensive view that saving is a function of perceived future needs. Therefore, the concepts of 'a prompt to action' and 'control of expenditure' are important in understanding saving motives (Wärneryd, 1999, p.73).

Based on 1995-2004 SCF data, approximately 57% of American households save (Yuh & Hanna, 2010). Although risk tolerance is usually associated with investing, it also plays a role in the decision to save. Financial risk tolerance is the willingness to accept variation in investment returns. Risk tolerance has been found to be related to several demographic factors: income, years until retirement, education, gender, marital status, assets, self-employment, and race (Sung & Hanna, 1996; Yao et al., 2004). Gilliam, Goetz, and Hampton (2008) studied the financial risk tolerance of a small sample of couples and found higher levels of education predicted greater risk tolerance for the couple. Deaves et al. (2007) concluded that risk taking is negatively linked to age and positively associated with income. Numerous studies have linked risk tolerance with gender, with women scoring lower on risk tolerance measures and holding more conservative portfolios than men (Bajtelsmit et al.,1999; Fisher, 2010; Hallahan, Faff, & McKenzie, 2004; Neelakantan, 2010; Speelman, Clark-Murphy, & Gerrans, 2007; Watson & McNaughton, 2007). Yet Embrey and Fox (1997) concluded that although gender influences some investment decisions, it is not the dominant factor influencing investment choice.

Using a university sample, Grable and Joo (2004) identified psychological factors such as self-esteem to be associated with financial risk tolerance. People with higher levels of financial risk tolerance tend to save more (Deaves et al., 2007; Huston & Chang, 1997; Van Rooij et al., 2012). In addition, Finke and Huston (2003) found households with greater risk tolerance accumulated significantly more net worth. Their study found risk tolerance was a significant predictor of household wealth, especially for those over the age of 65. Based on these studies, psychological, economic, and demographic factors need to be considered when studying risk tolerance.

The life-cycle hypothesis (LCH) suggests people will maximize lifetime utility by smoothing consumption over their lifetime (Ando & Modigliani, 1963; Modigliani & Brumberg, 1954). Using the Consumer Expenditure Survey and Panel Study of Income Dynamics data, Bernheim, Skinner, and Weinberg (2001) found weak support for the LCH in determining differences in retirement wealth in the United States. Instead, the researchers concluded that hyperbolic discounting theories better explained differences in wealth accumulation as decisions were made more according to "rule of thumb" or "mental accounting" strategies rather than classic LCH variables. To better explain consumer decision-making and behavior, Shefrin and Thaler (1988) developed the behavioral life-cycle (BLC) hypothesis. The BLC uses the constructs of self-control, mental accounting, and framing to explain consumer decision-making behavior. The ability to plan for the future and the establishment of goals requires effort and self-control. In the context of the BLC, self-control is any activity that reduces or delays consumption. The process of dividing assets into different accounts, designated for specific purposes, is called mental accounting (Thaler, 2004). Mental accounting is often used as a way to increase self-control. For example, an account that is labeled an emergency fund lowers the propensity to spend from this account on non-emergency items (Shefrin & Thaler, 1988). In other cases, self-control can be facilitated by governmental or financial institution restrictions allowing

limited access to retirement accounts and imposing penalties on early withdrawals. Some households who recognize the need to save may choose accounts with restrictions in order to reinforce their initial decision to save and add barriers to spending. Although early withdrawal penalties can be interpreted as punitive and not voluntary, because funds can still be withdrawn, these examples may be considered within the realm of self-control mechanisms. Rabinovich and Webley (2007) found that households with longer time horizons and greater self-control tended to implement their saving plans. The best evidence to date of the value of self-control is provided by Rha, Montalto, and Hanna (2006) showing the benefits of savings rules.

Self-control is conceptually similar to self-regulation, the process by which people exert control over their thoughts, feelings, and impulses (Baumeister, Gailliot, DeWall, & Oaten, 2006). Studies have shown that self-regulation is related to financial behavior (Howlett, Kees, & Kemp, 2008; Vohs & Faber, 2007). Howlett and colleagues found that when self-regulatory resources were depleted, college seniors were less likely to indicate they plan to participate in a retirement plan. Similarly, consumers whose self-regulatory resources were depleted were more likely to spend impulsively (Vohs & Faber, 2007). Some of the strongest evidence on self-control and savings comes from a pioneering study by Rha et al. (2006) which demonstrated the strong link between savings and self-control mechanisms (mental accounting and savings rules) practiced by households. Using the SCF measure of spending (less than income or not) as the dependent variable, they examined whether the respondent reported saving, five savings goal categories, and three types of savings rules. Planning ahead for foreseeable expenses and having savings rules were used as indicators of self-control mechanisms. Results clearly indicated that households with savings rules were more likely to save than those who did not have savings rules. Controlling for demographics and financial variables, Rha et al. (2006) concluded that behavioral life cycle (BLC) variables affect the likelihood of saving, and having savings rules showed the greatest impact on propensity to save.

Framing has to do with how increases in wealth are perceived. Salary income is framed, and therefore spent, differently than bonus income which, like income tax refunds, is more likely to be saved. The closer wealth increases are to income, the more likely they will be used for expenditures; however, irregular income like bonuses or asset increases are less likely to be consumed (Shefrin & Thaler, 1988). Therefore, how increases in wealth occur can influence the rate at which it is consumed. Since financial risk tolerance is closely related to saving behavior, and saving behavior is a result of consumer decision-making, it is natural to assume a relationship should exist between BLC variables and financial risk tolerance. However, no study has used the constructs of BLC to investigate financial risk tolerance.

Theoretical Framework

Shefrin and Thaler's (1988) behavioral life-cycle (BLC) hypothesis provided the theoretical framework for this study. Traditional life-cycle hypothesis (LCH) models attribute variations in wealth to differences in time preference, risk tolerance, relative preferences for work versus leisure in later life, and related factors (Ando & Modigliani, 1963; Bernheim et al., 2001; Modigliani & Brumberg, 1954). Shefrin and Thaler developed the BLC hypothesis to provide a framework that better explains household behavior and to enrich the LCH by incorporating three psychological components: self-control, mental accounting, and framing. For example, the factor of self-control acknowledges that willpower is required to make decisions that are in the household's best interest for the long run.

Risk tolerance is the willingness to accept variation in investment outcomes, or stated another way, income streams from investments. Changes in income streams from investments could, in turn, impact levels of consumption. So, another way of defining risk tolerance is the willingness to accept the possibility of variation in consumption. Change in consumption requires self-control, which is directly associated with being oriented toward the future (Rabinovich & Webley, 2007). Future-oriented people are willing to forgo consumption today for the benefit of additional consumption at some point in the future. Behavioral economists are exploring ways to make it easier for consumers to exercise self-control via commitment strategies such as automatic deposits in retirement or savings accounts (Thaler & Benartzi, 2004; Thaler & Shefrin, 1981). Therefore, there may be an association between self-control and risk tolerance.

Mental accounting is the process of separating assets into different categories, each with a different propensity to consume (Thaler, 2004). Assets can be separated mentally, or they can be separated physically, such as depositing funds into separate savings or investment accounts. The common practice of segregating funds and classifying them for a specific purpose can be observed when households label a savings account as "children's education fund" or "new home down payment." Section 529 college savings accounts are

a specific example of account segregation. Although dollars are fungible, people have a tendency to compartmentalize money for different goals. Households are much less likely to withdraw money from a savings account designated for the down payment on a home than they are to withdraw from a checking account, even if the balance in each account is the same. Economic theory indicates that money should be fungible, but household behavior indicates it is not (Thaler, 2004). The process of separating funds by purpose in and of itself does not imply a change in the risk tolerance of the household. A household with two checking accounts and three savings accounts may be no more or less risk tolerant than a household with one checking and savings account. However, given the correlation between investing and risk tolerance, it would be reasonable to expect households with a brokerage or investment account to be more risk tolerant than households without such accounts.

Framing has to do with the way people's attitudes can change based upon how information is presented to them (Tversky & Kahneman, 1981). How people think about saving and investing could determine their willingness to postpone consumption. In addition, how a person is paid, receiving the same amount of income each pay period, or earning irregular amounts at irregular intervals, could influence risk tolerance. Shefrin and Thaler (1988) show that people have a different marginal propensity to consume regular income versus bonus income. Risk tolerance could be related to a person's comfort with variable income. Therefore, someone who chooses self-employment or an occupation that has significant income variability could be expected to have higher risk tolerance than someone who is employed in a job with a regular income and employee benefits. On the other hand, households with unpredictable income may feel the need to maintain a large emergency fund and therefore may appear to be less risk tolerant. It is anticipated that framing will be related to risk tolerance, but the effect could be either positive or negative due to how the individual perceives income variability.

Hypotheses

The BLC constructs of self-control and framing are likely to be significantly associated with financial risk tolerance. It is unclear if the practice of separating assets into different mental accounts will have an effect on risk tolerance. However, if individuals include investment accounts in their mental accounting schema, then mental accounting could be related to risk tolerance due to the direct link with the investing process.

H1: Respondents who have more self-control have greater risk tolerance.

H2: There is a relationship between framing and risk tolerance, but the direction of the relationship is uncertain.

Method

Data and Sample

Data in this study were collected under the sponsorship of NC1172, a multistate research project entitled "The Complex Nature of Savings: Psychological and Economic Factors." The study was funded by 12 Agricultural Experiment Stations of participating land grant universities in the United States. Data were collected by Survey Sampling International LLC utilizing a web-based survey in December, 2010. A total of 1,034 surveys were collected in a two-week period (Hayhoe & Gutter, 2012). After removing records with missing data and households with income greater than $80,000, the sample size was reduced to 884 households. The $80,000 threshold for moderate income captured approximately 70% of all U.S. households and approximated the median income for a married couple in the U.S. (U.S. Census Bureau, 2012).

Dependent Variable

The dependent variable in this research was a 5-item risk tolerance scale developed by Grable and Joo (2004).

1. Investing is too difficult to understand.
2. I am more comfortable putting my money in a bank account than in the stock market.
3. When I think of the word "risk" the term "loss" comes to mind immediately.
4. Making money in stocks and bonds is based on luck.
5. In terms of investing, safety is more important than returns.

Response options ranged from strongly agree to strongly disagree. Responses are coded from 1 to 5 and summed to obtain a score for each participant. The original response scale was modified slightly with the addition of a neutral response because most of the other scales in this study used a 5-point Likert scale. The range for possible responses was 5 to 25. A low score on the scale represents low financial risk tolerance, and a high score indicates high financial risk tolerance.

Independent Variables

Independent variables of interest were questions measuring self-control, mental accounting, and framing. Self-control refers to actions taken to constrain consumption or increase savings. It encompassed time preference or the ability to say no to spending impulses for a future benefit. Financial literacy, knowledge, and feeling of personal power (self-efficacy) should be related to self-control. On the other hand,

feelings of money anxiety could decrease self-control. Self-control was operationalized by the following items:

- How would you describe your family's spending over the past year? Spending exceeded, equaled, or was less than income. (Survey of Consumer Finances, 2007)
- For me to deposit into a savings or investment account would be… impossible – possible.
- It is mostly up to me whether or not I deposit into a savings or investment account at least once per quarter in the coming year.
- Money Attitudes - Anxiety Scale (Roberts & Sepulveda, 1999; Yamauchi & Templer, 1982)
- In planning your family's saving and spending, which of the time periods listed is most important? Next few months to longer than 10 years. (Survey of Consumer Finances, 2007)
- Impulsivity Scale (Rook & Fisher,1995)
- Self-Efficacy Scale (Sherer et al., 1982)
- Financial Knowledge and Financial Literacy questions (Lusardi, 2009)

Mental accounting refers to splitting money into different mental accounts for different goals. Creating mental accounts assigns each account a different marginal propensity to consume. Mental Accounting was operationalized as responses to the following survey questions:

- If you have a spouse, do you combine assets with a spouse for planning purposes?
- How often do you monitor your spending?
- Do you have written financial goals?
- How has the current economic situation impacted the amount you save? I save: 1=a lot less, 2=a little less, 3=unchanged, 4=a little more, 5=a lot more
- Beyond your family's financial resources, if you needed at least $3,000, who could you turn to for this money? (Survey of Consumer Finances, 2007)
- Did you contribute to a (checking, savings, brokerage, educational savings plan, individual retirement account, employer provided retirement account, savings bonds, or debt reduction) account within the past year?

Each of the questions concerns the concept of dividing assets into separate accounts and planning or monitoring spending. The questions relating to monitoring spending and amount saved were measured with a 5-point Likert scale. The question regarding $3,000 of emergency funds included five options, ranging from friends to bank loans and credit cards, as well as an open-ended option. Each option the respondent indicated was coded as a 1, and the number of emergency fund sources was then summed.

Framing refers to the notion that how information is presented or perceived can affect the outcome. Money received in a lump sum is treated differently than money received on a recurring basis. Individuals can influence one another's perceptions of financial situations. Framing was operationalized as responses to the following questions:

- People who are important to me think I should or should not save money at least once per quarter in the coming year.
- For me to deposit into a savings account at least once per quarter in the coming year is Harmful – Beneficial.
- How is the majority of your family's income received? Same amount of income regularly, different amounts of income regularly, income received at irregular intervals.
- How has the current economic situation impacted your opinion about the importance of saving? Less important – More important

For a complete description of all the scales used in the research, see Hayhoe and Gutter (2012). The demographic, education, and financial variables included age, age squared, household income, household assets, gender, employment status, homeownership, family size, race, and education. Income, assets, and family size were included as categorical variables. Both age and age squared were included due to expected reductions in risk tolerance as retirement approaches. The change in risk tolerance can be non-linear with respect to age, so age squared was included to provide a better fit. The sample was 81.9% White, and the small numbers and limited racial variety warranted collapsing the categories into one category of non-White (18.1%). Employed includes respondents who indicated they are working either part-time or full-time.

Since the research question seeks to understand if the BLC variables contribute to financial risk tolerance and the dependent variable was treated as a continuous variable, hierarchical ordinary least squares regression was chosen for the statistical analysis. This method enabled the researchers to determine if the BLC variables add to the overall model by the evaluation of the R-squared change statistic. The data were reviewed for potential mulitcollinearity issues and none were identified; the variance inflation factor (VIF) was under 2.2 for all items.

Results

Descriptive Statistics

Table 1 includes the descriptive statistics for the 884 households. In order to capture the low-to-moderate income demographic, the sample was limited to households with incomes of $80,000 per year or less. The average age of respondents was 46.5 years old with a range of 18 to 85.

Regression Analysis

Table 2 presents a hierarchical multiple regression of financial risk tolerance regressed on four categories of explanatory factors. In Model 1, only financial, education, and demographic variables were included. This regression produced a statistically significant adjusted R^2 of 0.125, meaning that 12.5% of the variance in risk tolerance could be explained with the combination of financial, education, and demographic characteristics. In this model, assets, gender, and graduate education were significant; those who had a graduate education or household assets of more than $100,000 scored significantly higher on the risk tolerance scale, and women scored significantly lower than men.

In Model 2, nine independent variables measuring the BLC construct of self-control were added. The inclusion of self-control into the regression increased the amount of the variance explained by 9.6% (R^2 change = 0.096, $F(9,855)= 12.01$, $p <.001$). Of the nine measures of self-control included in the model, seven were significant in predicting risk tolerance. All of the coefficients for the self-control variables were positive, with the exception of the money attitudes of impulsivity and anxiety, indicating a positive relationship between increased self-control and risk tolerance. In Model 2, significant variables included age, assets over $100,000, gender, graduate education, spending vs. income, it is up to me to save, self-efficacy, money attitudes—anxiety, time horizon, financial literacy, financial knowledge, brokerage account ownership, perception of saving, and importance of saving. With the addition of self-control variables into the model, age became a significant variable. The results of the hierarchical regression supported Hypothesis 1 as respondents who had greater self-control tended to have greater risk tolerance.

In Model 3, 12 independent variables measuring the BLC construct of mental accounting were added. The mental accounting variables provided an R-squared change of 0.026, $F(12,843)=2.47$, $p =.003$, indicating the mental accounting variables added to the explanatory value of the model in addition to that which was achieved with financial, education, demographic, and self-control variables alone. In the mental accounting variables, only brokerage account ownership was significantly associated with risk tolerance.

In Model 4, four independent variables measuring the BLC framing construct were added. The framing variables provided an R-squared change of 0.013, $F(4,839)=3.67$, $p =.006$. The framing variable results showed a positive relationship between how respondents frame income and saving and their risk tolerance. The results of the hierarchical regression supported Hypothesis 2 that a relationship between framing and risk tolerance exists. The significant variables for framing included saving is beneficial to me and saving is more important to me now. As respondents agreed more with these statements, their risk tolerance scores decreased. The full model explained 24% of the change in risk tolerance in low-to-moderate-income households, with the BLC variables explaining 12% more than what was explained by financial, education, and demographic variables.

Discussion and Implications

The results show the behavioral life-cycle variables of self-control, mental accounting, and framing were positively associated with risk tolerance for low-to-moderate-income respondents. The first hypothesis, respondent risk tolerance increases as self-control increases, was supported in this research. The adjusted R-squared change with the addition of the self-control variables was 0.10, indicating that 10% of the total variation in financial risk tolerance was explained by self-control.

The second hypothesis, a relationship between risk tolerance and framing exists, was confirmed in this study. The research indicates a positive association between framing and risk tolerance. In particular, there was a negative association between the importance of saving and risk tolerance. Those who perceive saving to be important and beneficial have a lower risk tolerance than those who do not. The effect of introducing framing variables into the overall model was small. Only 1% of the variance in risk tolerance was explained by the framing variables. There was a positive association with mental accounting and risk tolerance. However, this positive association was found with only one variable (the existence of a brokerage account), and likely reflects the positive association between investing and risk tolerance.

Consistent with other research on financial risk tolerance, this study found a significant age effect; a negative relationship between age and the risk tolerance scale was supported (Bakshi & Chen, 1994; Jianakopolos & Bernasek, 2006;

Table 1. Descriptive Statistics (*N*=884)

	Percentage	Mean	Standard Deviation
Risk Tolerance Scale (DV)			
Investing difficult to understand		3.11	1.15
More comfortable with bank		2.33	1.12
Risk means loss		2.41	1.04
Making money in stocks is luck		2.81	1.06
Safety more important than return		2.46	0.97
Risk Tolerance Scale (summation)		13.14	4.01
Demographics			
Age		46.5	17.29
Age Squared		2,460	1,628
Household Income			
$0 - $20,000	25.5		
$20,000 - $40,000	35.6		
$40,000 - $60,000	25.3		
$60,000 - $80,000	13.6		
Household Assets			
$0 - $1,000	36.8		
$1,000 - $10,000	17.4		
$10,000 - $100,000	28.8		
Over $100,000	17.1		
Female	50		
Currently Working	48.3		
Homeowner	52.8		
Household Size			
1	30.4		
2	36.2		
3	14.7		
4 or more	18.7		
White	81.9		
Education			
High School or less	25.3		
Some College	34.1		
Associate's Degree	13.9		
Bachelor's Degree	18.8		
Graduate Degree	7.9		

Palsson, 1996). In addition, there was a gender effect, with women scoring significantly lower on the financial risk tolerance scale than men (Bajtelsmit et al., 1999; Embrey & Fox, 1997; Watson & McNaughton, 2007). Furthermore, risk tolerance tended to increase with increased education. Those who completed a graduate degree showed significantly higher levels of risk tolerance compared to those who only completed high school. This finding was consistent with other research which found a positive association between higher education level and financial risk tolerance (Gilliam & Grable,

Table 1 (continued). Descriptive Statistics (*N*=884)

	Percentage	Mean	Standard Deviation
Self-control			
Spending vs. Income		1.9	0.78
Can I Save Regularly		5.16	2.79
It is up to me to Save		2.92	2.38
Self-efficacy		60.81	11.08
Impulsivity		20.53	7.54
MA – Anxiety		13.14	3.86
Time Horizon		2.38	1.36
Financial Literacy		1.84	0.95
Financial Mgmt. Knowledge		3.26	1.23
Mental Accounting			
Combine Assets with Spouse	38.4		
Do Not Have a Spouse	41.3		
Do Not Combine Assets with Spouse	20.3		
Emergency Cash Access		1.01	1.07
In the past year did you contribute to			
Checking, Savings, CD	40.8		
Savings Bonds	11.1		
Brokerage Account	11.9		
Educational (529 Plan) Account	6		
IRA	14.6		
Retirement Plan, 401k Account	20.1		
Debt Reduction	24.3		
Monitor Spending		3.27	1.43
Written Goals		1.71	0.45
Save More Now		2.94	1.17
Framing			
Income Predictability		1.44	0.66
People think I should save		3.84	2.36
Saving is beneficial to me		6.34	2.78
Saving is more important now		3.69	0.94

2010; Grable & Joo, 2004; Sung & Hanna, 1996). Household wealth as measured by a categorical variable was significant in predicting risk tolerance. Respondents with wealth of $100,000 or more were more likely to be risk tolerant than households with less wealth. This finding was not surprising since the capability to take financial risk increases with wealth, which was consistent with other research on risk tolerance (Bernheim et al., 2001; Sung & Hanna, 1996). In total, the financial, education, and demographic variables explained 12% of the variance in financial risk tolerance.

The results of this study have several implications related to the importance of psychology and behavior with regard to personal finance. The results show that the behavioral life-cycle hypothesis is helpful in explaining risk tolerance in low-to-moderate-income households. The variables measuring self-control, mental accounting, and framing successfully predict respondent risk tolerance. Increased risk tolerance is beneficial to households that seek to save for future consumption. Self-control is the most significant variable predicting financial risk tolerance. This indicates

Table 2. OLS Hierarchical Regression BLC and Risk Tolerance (*N*=884)

	Model 1		Model 2		Model 3		Model 4	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Constant	13.36***	.40	11.35***	1.26	12.3***	1.51	12.64***	1.55
Demographic								
Age	-.01*	.01	-.02**	.01	-.03**	.01	-.03**	.01
Age Squared	.00	.00	.00	.00	.00	.00	.00	.00
Income (ref: $0-$20,000)								
$20,000 – $40,000	-.32	.35	-.37	.34	-.42	.34	-.39	.34
$40,000 – $60,000	-.39	.40	-.58	.38	-.52	.39	-.45	.39
$60,000 – $80,000	-.43	.50	-.53	.48	-.58	.49	-.48	.50
Assets (ref: $0-$1,000)	*							
$1 – $10,000	.31	.38	.24	.37	.35	.37	.34	.37
$10,000 – $100,000	.34	.34	.30	.33	.23	.34	.22	.34
$100,000 +	3.35***	.44	2.86***	.43	2.41***	.45	2.39***	.45
Female	-1.69***	.26	-1.43***	.25	-1.31***	.25	-1.23***	.26
Currently Working	-0.06	.29	.07	.27	.16	.28	.15	.28
Homeowner	-0.26	.30	-.44	.29	-.51	.29	-.45	.29
Household Size (ref: 1)								
2	-.20	.32	-.19	.31	-.45	.35	-.45	.35
3	-.02	.43	-.09	.41	-.26	.43	-.28	.43
4 or more	.11	.42	.17	.40	-.05	.43	-.04	.42
White	-.32	.35	-.34	.33	-.36	.34	-.34	.34
Education (ref: High School)								
Some College	.26	.34	.23	.32	.22	.32	.28	.32
Associate's Degree	.40	.44	.33	.42	.40	.42	.41	.42
Bachelor's Degree	.74	.40	.34	.39	.32	.40	.38	.40
Graduate Degree	1.75**	.54	1.34**	.52	1.30*	.52	1.31**	.52
Self-Control								
Spending vs. Income			.36*	.17	.33	.17	.35*	.17
Can I Save Regularly			-.03	.05	-.01	.05	.07	.06
It is up to me to Save			.19***	.06	.16**	.06	.14*	.06
Self-efficacy			.03*	.01	.03	.01	.03*	.01
Impulsivity			-.02	.02	-.03	.02	-.03	.02
MA-Anxiety			-.20***	.03	-.19***	.03	-.17***	.04
Time Horizon			.23*	.09	.22*	.09	.20*	.09
Financial Literacy			.39**	.14	.40**	.15	.41**	.15
Financial Mgmt. Knowledge			.39***	.11	.38***	.11	.42***	.11

*p<.05, **p<.01, ***p<.001

that financial counselors and planners could focus on assisting households to improve self-control metrics if the household desires to achieve returns that exceed inflation. Continued emphasis should be placed upon the use of commitment strategies to help low-to-moderate-income households save regularly. These commitment strategies improve self-control

Table 2 (continued). OLS Hierarchical Regression BLC and Risk Tolerance (*N*=884)

	Model 1		Model 2		Model 3		Model 4	
	Beta	**SE**	**Beta**	**SE**	**Beta**	**SE**	**Beta**	**SE**
Mental Accounting								
Combine Assets w/ Spouse					-.01	.00	-.01	.00
Emergency Cash Access					.13	.13	.16	.13
Checking or Savings Acct					-.31	.29	-.29	.28
Savings Bonds					-.17	.48	-.20	.48
Brokerage Acct					2.07***	.50	1.96***	.50
Educational Acct					-.61	.67	-.73	.66
IRA					.17	.43	.25	.43
Ret Plan 401(k)					-.61	.36	-.54	.36
Debt Reduction					-.44	.31	-.38	.31
Monitor Spending					-.09	.09	-.1	.09
Written Goals					.03	.29	.03	.29
Save More Now					-.10	.11	-.03	.12
Framing								
Income Predictability							.32	.19
People think I should save							-.02	.06
Saving is beneficial to me							-.14**	.05
Saving more important now							-.28*	.14
R^2	.144		.240		.266		.279	
Adjusted R^2	.125		.215		.231		.241	

*p<.05, **p<.01, ***p<.001

and lower the psychological burden related to saving. An example of making a commitment to save would be a regular automatic deposit to savings. Behavioral economics suggests that it is easier to make a commitment today for a future action (Thaler & Benartzi, 2004), so educators and counselors should encourage clients to sign up today to save more in the future.

Planners should be aware that how individuals think about saving is related to their financial risk tolerance. Based on results of earlier studies using the Survey of Consumer Finances (Sung & Hanna, 1996; Yao et al., 2004), low-to-moderate-income households follow a pattern of financial risk tolerance attributes similar to the population as a whole. The use of mental accounts is common among low-to-moderate-income households, but their usage does not appear to influence household risk tolerance unless the household owns a brokerage account.

The framing variables indicate that the way a person thinks about saving is related to their risk tolerance. Only two variables regarding framing are significantly related to one's level of risk tolerance. The respondents who perceived savings as beneficial and of more importance, given the current economic situation, had lower risk tolerance. It is possible that recent economic conditions have scared people away from stock investing and into less volatile saving accounts. Therefore, people with low risk tolerance can perceive saving as beneficial given the current economic climate. Even though the effect as shown in Table 2 is small, this construct should not be ignored.

Being more financially knowledgeable and having a college education are associated with increased financial risk tolerance. There is a need to educate low-to-moderate-income households in basic money management. Only one out of three respondents were able to answer the three Lusardi (2009) financial literacy questions, on compound interest, inflation impact, and a single company stock versus a mutual fund, correctly. These findings validate the efforts of government to implement programs through the USDA's National Institute

of Food and Agriculture and the new Consumer Financial Protection Bureau to increase financial literacy. Together with financial education partners such as the National Endowment for Financial Education, the Association for Financial Counseling and Planning, Cooperative Extension, Financial Industry Regulatory Authority, and others, local and federal government efforts should be afforded the necessary support to continue educating Americans on basic financial literacy.

Financial risk tolerance can be influenced through education. Results from Van Rooij et al. (2012) show that financial education and financial literacy training can help people increase the likelihood of investing in the stock market and increase the likelihood of retirement planning. Financial counselors and planners need to continue to strive to reach low-to-moderate-income households with financial education and outreach programs so these households can benefit from the equity premium that comes with stock investments.

A few limitations of the study need to be acknowledged. The data were collected by an Internet survey sampling firm. The sample is based on a nationally drawn sample, but it was not nationally representative. Further, a large percentage of the sample was either unemployed or out of the labor force with only 48% of the sample working for pay. A possible explanation is that those who are unemployed have more time to complete online surveys. Whether or not respondents actually saved during the previous year was self-reported and thus subject to error. Although the Grable-Joo (2004) risk measure has been widely used in research, a variety of measures exist, and there is considerable disagreement regarding the best way to define and measure financial risk tolerance (Hanna, Waller, & Finke, 2008). Our measure of risk tolerance is not defined as the inverse of risk aversion (Pratt, 1964), but a measure that attempts to gauge one's willingness to save and invest in risky assets. Hanna et al. (2008) argue that risk capacity and expectations are different from risk tolerance. Further, almost all measures focus on investment risk tolerance, whereas this study focused on savings. A recent study by Guillemette, Finke, and Gilliam (2012) recommends measuring risk tolerance using questions on loss aversion and self-assessment. Therefore, it is important to interpret the results utilizing the Grable-Joo (2004) definition of risk tolerance with caution. Similarly, the constructs of mental accounting and framing are difficult to measure. Factors that influence savings, such as self-control, may be related to cognitive ability as well as myriad other factors not measured in this study. It is likely that some measurement error was introduced to the model when proxies were established for these variables. Additional research is needed to create scales that more accurately measure BLC constructs. Despite these limitations, this study makes a contribution by focusing on low-to-moderate-income households, which are most in need of financial education and encouragement to save.

Continued research is needed in this area with larger nationally representative samples that include more psychological and behavioral questions, as recommended by Guillemette et al. (2012). Longitudinal studies are needed to better understand the effect of financial education and other interventions on consumer financial decision making. This study used a general self-efficacy measure, but self-efficacy is domain specific, so future research should use a financial self-efficacy measure such as that developed by Lown (2011). In addition, further research is needed to more thoroughly assess and understand mental accounting and framing effects. The development of additional intervention tools grounded in behavioral economic theory is necessary to assist financial counselors and practitioners to improve consumer decision making processes.

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